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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,119	09/10/2003	Mitsuo Kawasaki	9281-4620	3593

7590 02/21/2007  
BRINKS HOFER GILSON & LIONE  
P.O. BOX 10395  
CHICAGO, IL 60610

EXAMINER
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BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
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1773

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/659,119

Applicant(s)

KAWASAKI ET AL.

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7,8,12-16 and 20-25 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7,8,12-16 and 20-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/08/06</u> . | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### ***Response to Amendment***

1. Amendments to claims 1 and 8 and cancellation of claims 6, 9 and 19, filed on December 8, 2006, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Examiner's Comments***

3. Regarding the limitation(s) "epitaxially disposed in the stack" in the claims, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in Applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that the broadest reasonable interpretation of the term "epitaxially disposed" is simply that the crystals are deposited on each other and correlated in some manner. The Examiner notes that the exact correlation (*e.g. an upper crystal corresponds to only a single lower crystal, the upper crystal is larger than the lower crystal, the upper crystal is smaller than the lower crystal, etc*) is not claimed, and as such the claim limitation is essentially open to *any* correlation. I.e. for the purposes of evaluating the prior art "epitaxially disposed" has been interpreted to simply require two crystalline materials that are

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disposed on top of each other in close proximity thereto. The Examiner has *not* taken the term "epitaxially disposed" to mean "directly adjacent" and should Applicants desire to require that all the fine crystals are directly adjacent to each other, they should clearly amend the claims to positively recite this feature.

### ***Request for Continued Examination***

4. A Request for Continued Examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 8, 2006 has been entered. An action on the RCE follows.

### ***Claim Rejections - 35 USC § 103***

5. Claims 1, 3 – 5, 21, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. (U.S. Patent No. 5,849,400) in view of Yoshikawa et al. (U.S. Patent No. 6,132,892).

Regarding claim 1, Hiramoto et al. disclose a plated magnetic film comprising Co and Fe, wherein the plated magnetic film comprises columnar crystals extending in a film thickness direction, wherein a stack of fine crystals having an average crystal particle diameter of 200 Å or less constitutes the columnar crystals, the fine crystals being epitaxially disposed in the stack, and wherein a plurality of the columnar crystals

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are provided adjacent one another in a film surface direction with grain boundaries extending in the film thickness direction and separating the columnar crystals (see *Paragraph No. 8 of the Office Action mailed February 9, 2006 and Paragraph No. 8 of the Office Action mailed August 8, 2006, as well as Paragraph 3 above*).

Hiramoto et al. fail to disclose the fine crystals having a body centered cubic structure, nor the (110) plane meeting Applicants' claimed limitations.

However, Yoshikawa et al. teach that it is known in the art to form soft magnetic films comprising Co and Fe in the form of fine crystals (*Figures and Abstract*) wherein the crystals and (110) plane are preferentially controlled to meet Applicants' claimed limitations in order to provide a large magnetic flux density and large saturation magnetization (*col. 6, lines 10 – 30; and col. 11, line 35 bridging col. 12, line 59*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Hiramoto et al. to utilize a FeCo alloy meeting Applicants' claimed bcc and (110) plane limitations as taught by Yoshikawa et al., since such a structure provides a large magnetic flux density and large saturation magnetization.

Regarding claims 3 – 5 and 22, Yoshikawa et al. disclose CoFe films meeting applicants' claimed composition and property limitations (*Table 5*).

Regarding claims 21 and 25, Hiramoto et al. disclose the claimed limitations as relied upon in Paragraph No. 8 of the Office Action mailed February 9, 2006 and Paragraph No. 8 of the Office Action mailed August 8, 2006.

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6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. in view of Yoshikawa et al. as applied above, and further in view of Osaka et al. (U.S. Patent No. 6,063,512).

Hiramoto et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a magnetic CoFe film meeting applicants' claimed stress limitation.

However, Osaka et al. teach the importance of minimizing the film stress of a soft magnetic alloy for use in a magnetic head in order to insure a film of uniform quality (*col. 5, lines 55 – 62 and col. 7, lines 39 - 45*). The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film stress through routine experimentation, especially given the teaching in Osaka et al. regarding the desire to minimize the film stress to insure a film of uniform quality. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. in view of Yoshikawa et al. as applied above, and further in view of Sato et al. (U.S. Patent App. No. 2003/0151851 A1).

Hiramoto et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a surface roughness meeting applicants' claimed limitations.

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However, Sato et al. teach that it is known to form pole pieces of FeCo material to possess surface roughness values meeting applicants' claimed limitations in order to insure that the surface is sufficiently flat for use as a pole piece in a thin-film magnetic head (*Paragraphs 0102 and 0145*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Hiramoto et al. in view of Yoshikawa et al. to use a FeCo layer meeting applicants' claimed surface roughness limitations as taught by Sato et al. since such a surface roughness is necessary to insure that the surface is sufficiently flat for use as a pole piece in a thin-film magnetic head.

8. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramoto et al. in view of Yoshikawa et al. as applied above, and further in view of Komuro et al. (U.S. Patent No. 6,034,847).

Hiramoto et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a specific resistance meeting applicants' claimed limitations.

However, Komuro et al. teach the importance of controlling the resistivity (i.e. the specific resistance) of a soft magnetic film for use in a magnetic head application to within applicants' claimed range in order to insure improved radio frequency performance (*abstract; col. 2, lines 32 – 37; and col. 3, line 46 bridging col. 4, line 2*).

The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as

the specific resistance/resistivity through routine experimentation, especially given the teaching in Komuro et al. regarding the desire to possess resistance values meeting applicants' claimed limitations in order to insure improved radio frequency performance.

9. Claims 1, 3 – 5, 21, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funayama et al. (U.S. Patent App. No. 2003/0197982 A1) in view of Yoshikawa et al. ('892).

Regarding claim 1, Funayama et al. disclose a plated magnetic film comprising Co and Fe, wherein the plated magnetic film comprises columnar crystals extending in a film thickness direction, wherein a stack of fine crystals having an average crystal particle diameter of 200 Å or less constitutes the columnar crystals, the fine crystals being epitaxially disposed in the stack, and wherein a plurality of the columnar crystals are provided adjacent one another in a film surface direction with grain boundaries extending in the film thickness direction and separating the columnar crystals (see *Paragraph No. 9 of the Office Action mailed February 9, 2006 and Paragraph No. 9 of the Office Action mailed August 8, 2006, as well as Paragraph 3 above*).

Funayama et al. fail to disclose the fine crystals having a body centered cubic structure, nor the (110) plane meeting Applicants' claimed limitations.

However, Yoshikawa et al. teach that it is known in the art to form soft magnetic films comprising Co and Fe in the form of fine crystals (*Figures and Abstract*) wherein the crystals and (110) plane are preferentially controlled to meet Applicants' claimed



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limitations in order to provide a large magnetic flux density and large saturation magnetization (*col. 6, lines 10 – 30; and col. 11, line 35 bridging col. 12, line 59*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Funayama et al. to utilize a FeCo alloy meeting Applicants' claimed bcc and (110) plane limitations as taught by Yoshikawa et al., since such a structure provides a large magnetic flux density and large saturation magnetization.

Regarding claims 3 – 5, 21 and 22, Yoshikawa et al. disclose CoFe films meeting applicants' claimed composition and property limitations (*Table 5*).

Regarding claim 25, Funayama et al. disclose the claimed limitations as relied upon in Paragraph No. 9 of the Office Action mailed February 9, 2006 and Paragraph No. 9 of the Office Action mailed August 8, 2006.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funayama et al. in view of Yoshikawa et al. as applied above, and further in view of Osaka et al. ('512).

Funayama et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a magnetic CoFe film meeting applicants' claimed stress limitation.

However, Osaka et al. teach the importance of minimizing the film stress of a soft magnetic alloy for use in a magnetic head in order to insure a film of uniform quality (*col. 5, lines 55 – 62 and col. 7, lines 39 - 45*). The Examiner deems that it would have been

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obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the magnitude of the film stress through routine experimentation, especially given the teaching in Osaka et al. regarding the desire to minimize the film stress to insure a film of uniform quality. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funayama et al. in view of Yoshikawa et al. as applied above, and further in view of Sato et al. ('851 A1).

Funayama et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a surface roughness meeting applicants' claimed limitations.

However, Sato et al. teach that it is known to form pole pieces of FeCo material to possess surface roughness values meeting applicants' claimed limitations in order to insure that the surface is sufficiently flat for use as a pole piece in a thin-film magnetic head (*Paragraphs 0102 and 0145*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Funayama et al. in view of Yoshikawa et al. to use a FeCo layer meeting applicants' claimed surface roughness limitations as taught by Sato et al. since such a surface roughness is necessary to

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insure that the surface is sufficiently flat for use as a pole piece in a thin-film magnetic head.

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funayama et al. in view of Yoshikawa et al. as applied above, and further in view of Komuro et al. ('847).

Funayama et al. and Yoshikawa et al. are relied upon as described above.

Neither of the above disclose a specific resistance meeting applicants' claimed limitations.

However, Komuro et al. teach the importance of controlling the resistivity (i.e. the specific resistance) of a soft magnetic film for use in a magnetic head application to within applicants' claimed range in order to insure improved radio frequency performance (*abstract; col. 2, lines 32 – 37; and col. 3, line 46 bridging col. 4, line 2*).

The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the specific resistance/resistivity through routine experimentation, especially given the teaching in Komuro et al. regarding the desire to possess resistance values meeting applicants' claimed limitations in order to insure improved radio frequency performance.

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13. Claims 8, 9, 12 – 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. ('892) in view of Hitachi, LTD (JP 62-226413 A), Hiramoto et al. ('400) and Sato et al. ('851 A1) for the reasons of record as set forth in Paragraph 14 of the Office Action mailed August 8, 2006 and in Paragraph 14 of the Office Action mailed February 9, 2006.

Regarding the amended limitations regarding the bcc crystal structure and the (110) plane, the Examiner notes that Yoshikawa et al. teach that it is known in the art to form soft magnetic films comprising Co and Fe in the form of fine crystals (*Figures and Abstract*) wherein the crystals and (110) plane are preferentially controlled to meet Applicants' claimed limitations in order to provide a large magnetic flux density and large saturation magnetization (*col. 6, lines 10 – 30; and col. 11, line 35 bridging col. 12, line 59*).

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. ('892) in view of Hitachi, LTD (JP 62-226413 A), Hiramoto et al. ('400) and Sato et al. ('851 A1) as applied above, and further in view of Moran (U.S. Patent No. 6,574,854 B1) for the reasons of record as set forth in Paragraph No. 15 of the Office Action mailed August 8, 2006 and in Paragraph 15 of the Office Action mailed February 9, 2006.

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15. Claims 8, 9, 12 – 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. ('892) in view of Hitachi, LTD (JP 62-226413 A), Funayama et al. ('982 A1) and Sato et al. ('851 A1) for the reasons of record as set forth in Paragraph 21 of the Office Action mailed August 8, 2006 and in Paragraph 21 of the Office Action mailed February 9, 2006.

Regarding the amended limitations regarding the bcc crystal structure and the (110) plane, the Examiner notes that Yoshikawa et al. teach that it is known in the art to form soft magnetic films comprising Co and Fe in the form of fine crystals (*Figures and Abstract*) wherein the crystals and (110) plane are preferentially controlled to meet Applicants' claimed limitations in order to provide a large magnetic flux density and large saturation magnetization (*col. 6, lines 10 – 30; and col. 11, line 35 bridging col. 12, line 59*).

16. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. ('892) in view of Hitachi, LTD (JP 62-226413 A), Funayama et al. ('982 A1) and Sato et al. ('851 A1) as applied above, and further in view of Moran (U.S. Patent No. 6,574,854 B1) for the reasons of record as set forth in Paragraph No. 22 of the Office Action mailed August 8, 2006 and in Paragraph 22 of the Office Action mailed February 9, 2006.

***Response to Arguments***

**17. The rejection of claims 1, 3 – 5, 7, 8, 12 – 16 and 19 - 25 under 35 U.S.C § 112 – 2<sup>nd</sup> Paragraph**

The above noted rejection has been withdrawn in view of applicant(s) arguments, which have been found persuasive.

**18. The rejection of claims 1, 3 – 5, 7, 8, 12 – 16 and 20 - 25 under 35 U.S.C § 103(a) – Various rejections predicated on Hiramoto et al. and Yoshikawa et al.**

**19. The rejection of claims 1, 3 – 5, 7, 8, 12 – 16 and 20 - 25 under 35 U.S.C § 103(a) – Various rejections predicated on Funayama et al. and Yoshikawa et al.**

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection. In so far as they apply to the present rejection of record, applicant(s) argue that none of the cited references “teaches or suggests columnar crystals having a (110) plane which exhibits the claimed preferred orientation” (*pages 7 and 8 of response*). The Examiner respectfully disagrees.

Applicant(s) are reminded that “the test for obviousness is not whether features of the secondary reference may be bodily incorporated into the primary reference’s structure, nor whether the claimed invention is expressly suggested in any one or all of the references, rather the test is what the combined teachings would have suggested to those of ordinary skill in the art.” *Ex parte Martin* 215 USPQ 543, 544 (PO BdPatApp 1981). In the instant case, Yoshikawa et al. is relied upon to teach preferred

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compositions and crystal structures (bcc and (110) plane parallel to the film surface), as noted in the rejection of record above.

### ***Conclusion***

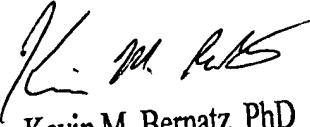
20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fukuzawa et al. (U.S. Patent No. 7,116,527 B1) discloses a hard magnetic film (not soft) comprising a columnar crystal structure substantially identical to applicants' disclosed structure, though the (110) plane is perpendicular to the film surface and not parallel (*entire disclosure*).

21. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The Examiner can normally be reached on M-F, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB  
February 14, 2007

  
Kevin M. Bernatz, PhD  
Primary Examiner